

WITH THE AUTHOR'S COMPLIMENTS.

THE THERAPEUTIC ACTION  
AND APPLICATION <sup>2</sup>  
TO THE  
MINERAL WATERS OF AIX-LES-BAINS,  
SAVOY.

A PAPER PRESENTED TO THE SECTION OF MEDICINE OF THE  
BRITISH MEDICAL ASSOCIATION AT BRIGHTON, AUG. 1886.

BY  
STANLEY M. RENDALL, M.D.,

*Aix-Les-Bains, Savoy.*

EDINBURGH:

E & S. LIVINGSTONE, 15 TAVIOT PLACE.

1887.



# THE THERAPEUTIC ACTION AND APPLICATION

OF THE

## MINERAL WATERS OF AIX-LES-BAINS,

SAVOY.

---

I HAVE NO intention of giving a full and complete description of the mineral springs of Aix-les-Bains, or of the Thermal Establishment; but a short account of the nature of the water, and of the means employed for its application, is necessary for the proper appreciation of its therapeutic value.

The mineral springs employed at Aix-les-Bains are two in number, but differ so slightly in their temperature (which varies from 114° to 117° F.) and composition, that practically they may be considered as one in their application.

The springs arise at a depth of about three quarters of a mile from the surface of the earth, with a temperature varying but slightly (114° to 117° F.), and a constant daily output of nearly a million gallons, a quantity doubled by the addition of cold water necessary to reduce the temperature to a point suitable for bath employment.

Their chemical composition classes them amongst the sulphur series, though, as compared with many other sulphur springs, their mineralisation is but feeble. The most important chemical

element is sulphuretted hydrogen, 41 milligrammes per litre; less important ones are carbonic acid gas, the hyposulphites, carbonates of calcium and magnesium, sulphates of the same bases, sulphate of alumina and soda, and chloride of sodium.

An important and peculiar element is found in the presence of a large quantity of an organic nitrogenous substance called "glairine" or "baregine." This is an unctuous substance rendering the water peculiarly soft and suitable for use in massage, no irritation or chapping of the skin following its use, as in the case of the harder waters.

Finally, in addition to their mineralisation and thermality, one must take into consideration, in the application of these waters, the existence or production of electricity. This latter factor was pointed out by the French chemist Scoutteten in 1851, and found, as compared with other mineral waters, to exist in a large quantity. This last element I merely mention as having to be taken into consideration, its mode of action and value not having been yet sufficiently determined.

The Thermal Establishment, built by the French Government, is a handsome building of three stories, containing fifty-one douche chambers for general or local douches, general and local vapour baths, swimming baths—either large public ones or smaller private ones for the individual or family,—simple reclining baths, needle baths, local, throat, eye, and ear douches, inhalation rooms, and spray rooms. The immense amount of water discharged daily, and the numerous bath-rooms, permit each day over 1000 baths and 2000 douches to be given.

Of the varied methods of applying the waters, by far the most important are the douche and vapour bath, a very short description of each of which I shall here give.

The douche rooms are distributed amongst the three floors of the bath house, and this at once ensures a different pressure of water at the disposition of the bath attendants, varying from fourteen metres on the lowest floor to four metres on the upper. This fact is of importance in connection with certain cardiac cases,

where a low pressure is essential, and its amount is thus not left to a possibly careless bath attendant. In addition, each douche room contains a metal box at a height of about six feet, so that the water, being first passed into this reservoir, has a pressure not exceeding the height at which it is placed. Each douche chamber is completely fitted up with a variety of apparatus,—cocks, nozzles, roses, elastic and metal pipes, bent at different angles, so that the mineral water can be applied to the patient in large or small jets; as a shower bath, or as a spray or fine rain, either descending, ascending, or horizontal; as a gentle continuous flow, or with such a force that it is impossible to stand against it without grasping an iron bar fixed into the wall for support.

The temperature of the douche chamber can also be varied, as that of the water, from its maximum of 117° F. to any lower point. The douche is administered, as a rule, with the patient sitting on a wooden stool; where necessary, it is given with the patient reclining on a canvas couch.

Each douche room has one or two bath attendants—*douchiers* or *douchières*—always skilled in massage, who conscientiously carry out the direction of the patient's medical man.

The vapour bath rank with, or next in importance to, the douche, and are either general or local. In the former the hot vapour arises from a large volume of the mineral water broken in its fall from the upper to the lower part of the establishment by coming into contact with discs. The displaced column of air, highly charged with hot sulphureous vapour, seeks exit at the outlets provided for it into wooden boxes or "caves," in which the patient sits, with the head alone outside. Another form of general vapour bath is where a continuous shower of the hot mineral water gives off its vapour in a room adjoining, and communicating with, the douche chamber. In this room, called the "bouillon," the patient remains for a prescribed time, either before or after his douche. The local vapour bath is on the same principle as the "cave," the vapour being conducted into metal boxes, varying in form according to that part of the body which it is necessary to bring under the action of the hot vapour.

The action of the waters can be divided under two heads—

### GENERAL AND LOCAL.

Their action on the system generally is shown, by an augmented activity of the excretory functions (chiefly those of the kidneys and skin), to consist in an increase of the movements of assimilation and disassimilation. Owing to this increased activity of the sweat glands the actual amount of urine in the twenty-four hours is in many cases diminished, but its solid constituents are increased in amount. The urea and uric acid are both augmented, but the uric acid is so to a greater degree than the urea. This action is of importance as showing why these waters are so useful in the arthritic diathesis.

The uric acid is found in the urine free, as shown by the presence of the characteristic lozenge-shaped crystals, and also in the form of urates. This increased excretion of uric acid is readily seen on taking specimens of the twenty-four hours' urine, during the first day or two of the patient's course of treatment, and then comparing it with specimens taken five or six days later, and again after similar intervals of a few days. Take, for example, an ordinary case under treatment for gout. The urine, at first normal in quantity, colour, and specific gravity, becomes, after a few days, more scanty, dark, troubled, and of a higher density, continues so to a lesser or higher degree, and gradually returns to its normal appearance and condition. A volumetric analysis of such a urine, when these changes are at the highest, shows an increase of uric acid from the normal forty or eighty centigrammes (the latter being a high percentage) up to one gramme, or one gramme twenty centigrammes per litre of urine. The urea is, as I have said, also increased, but to a less degree relatively than the uric acid, the amount varying from the normal up to forty or sixty grammes per litre. For the result of volumetric analysis I am indebted to my colleague, Dr Demeaux. It will thus be seen that the action of the Aix waters in these cases is to cause the direct expulsion of the morbid element from the



system, and not by increasing the alkalisation of the blood serum, as in the use of Vichy and other alkaline springs.

Prior to the expulsion of the poisonous acid principle from the system, it would seem to be set into a freer circulation in the blood current, and this probably accounts for the almost invariable occurrence of an exacerbation of the patient's usual aches and pains,—muscular, nervous, or articular,—a fact causing, frequently, great alarm to those undergoing a treatment, unless previously warned of the probable occurrence of such a condition. The bath attendants are well aware of this fact, and reassure their patients by telling them that the increased pains mean that the waters are, as they say, acting, and that they should congratulate themselves on the fact rather than complain. This exacerbation, however, in those cases that are going to do well, is speedily followed by an amelioration, or complete disappearance of the pain, an improvement that is probably coincident with, and dependent upon, the expulsion of the poisonous detritus from the system. I say probably, because I have not yet been able to make a sufficient number of observations to prove the fact, owing to the difficulty (with patients living in hotels) of getting specimens of the total twenty-four hours' urine.

I may add that the appearance of the increased pains is medically of importance as affecting the prognosis, cases where the pains disappear at once, from a sedative action of the hot water, and rubbing, not having such a good outlook as the first class I mentioned, where there is a primary aggravation.

As to the action of these waters upon the circulation, it is essentially sedative.

This sedative effect is seen, if looked for, in many if not most cases, but is markedly evident in those that have a high pulse rate when first they come under treatment, and it is especially so in that fashionable disease known as "irritable heart." In three cases of that description which came under my care last summer, bringing, and giving their diagnosis themselves, of "irritable heart," the fall at the end of the course was from fifteen to twenty pulsations in the minute, the character of the pulse improving at the

same time. I may state that the above, and indeed the majority of the patients that come under treatment in Aix, are what the French style "arthritiques," *i.e.*, of a gouty, or rheumatic, constitution, and that, therefore, may account for the favourable effect of the cure upon these cases, the irritability being here due to the presence in the circulation of a poison, and disappearing with its disappearance. The effect of the Aix waters on the circulation was most carefully worked out by Dr Vidal in 1874, in a series of observations upon twenty-one employés of the bath establishment, and upon ten of his patients. He found that in a treatment, suitably conducted as to temperature, the result was a lowering of the pulse rate, and slight elevation of the body heat; but that if a too high temperature were employed, with the addition of the general vapour bath,—producing excessive sweating,—the result, on the contrary, was an increased pulse rate, and a lowered temperature. I am not, of course, here taking into consideration the immediate effect of a hot douche, where there is an immediate, but transient, acceleration of the pulse.

In considering the three factors brought into use in the treatment at Aix, *viz.*, the temperature of the water, its mineralisation, and the massage,—it is difficult to draw any certain conclusion as to the part played by each; but certainly the temperature and the massage are very important. The mineralisation is, to begin with, feeble, so the amount of any medicinal element absorbed by the skin can be, in the usual mode of application of the water, but infinitesimal, and frequently, in the course of treatment, none of the mineral water is given internally.

In the treatment of the local results of rheumatism and gout, such as contraction of tendons and muscles, swollen and thickened joints, thickening of fibrous tissue, ankylosis, &c., the massage is of the utmost importance, indeed essential; but then it is invariably combined with the application of the sulphur water or its vapour, the latter being often necessary to allow of the massage being efficiently applied, to combat the pain and inflammation that sometimes arise on energetic local treatment being



used, in order to break down old adhesions, or relax stiffened joints and tendons.

If any inflammatory reaction does arise from a too vigorous interference in these cases, it is usually quite sufficient, to allay any such reaction, to suspend the general douche with massage, and have recourse simply to the local vapour bath, or Berthollet, as it is called.

#### INDICATIONS, AND CONTRA-INDICATIONS, FOR TREATMENT AT AIX.

The class of patients that does best—one may almost say invariably well—at Aix, is that large one known in France as the “*arthritique*,” a term which includes all suffering from manifestations of the gouty and rheumatic diatheses, whether those manifestations be articular, visceral, muscular, nervous, or cutaneous, and including the affection known variously as “*rheumatoid arthritis*,” “*rheumatic gout*,” “*chronic rheumatic arthritis*,” “*arthrite déformante*,” &c. &c.

Of course, even in these the most favourable cases, for a “cure” at Aix, there are certain contra-indications, to which I shall refer in a moment.

Other cases do well under the treatment, especially scrupulous affections of the joints and glands; certain surgical complaints, such as ankylosis after fracture, loss of muscular power from disuse, rupture, peripheral paralysis; finally, syphilis, where, by its eliminative action, the treatment at Aix allows of the administration of a mercurial course in those cases where an anti-specific course had been previously badly borne.

But it is in the first great class of “*arthritique*” that the best results are obtained.

Dividing this into two sub-divisions, the “*gouty arthritique*” and “*rheumatic arthritique*,” two very different lines of treatment have to be followed.

In the first, or true gouty case, the treatment should not be a prolonged one—from twelve to sixteen general douches, with

three or four days of repose where nothing is done, or a simple bath or swimming bath is taken, is an average course. The most important point to observe here, though, is the temperature, which should be moderate, from  $33^{\circ}$  C. to  $36^{\circ}$  or  $37^{\circ}$ , carefully watching the effect upon the patient's pulse, tongue, and bowels, and also upon previously affected articulations. A too exciting treatment—that is, one at too high a temperature—in these cases cannot be safely carried out without producing in many patients an intolerance of the waters, as shown by a pulse rising rapidly in number, disordered digestion, headache, sleeplessness, acute pains in the gouty articulations,—a series of symptoms compelling one at once to suspend, or at least alter, the treatment.

In patients recovering from a recent attack of gout, especial care has to be taken in the mode of giving the douche, the bath attendants being instructed as to which articulations they may, or may not, touch in the course of massage; in many, mere friction or even contact of the water being exceedingly painful, and impossible without risk of exciting an acute attack; here the so-called “révulsive” treatment has to be followed out, all parts save the affected ones being treated. The exact temperature and duration of treatment vary with the individual case (the patient's temperament, endurance, &c.).

By some of the medical men at Aix, the use of the vapour bath in true gout is doubted; some, however, use it in the form of local baths of short duration to the inflamed joint, and amongst these I class myself, having seen nothing but good follow their careful employment.

There is no doubt that there is a greater tolerance of the Aix treatment in a rheumatic than in a gouty patient, and it is often a question, in the case of the markedly gouty, to what extent the treatment, as regards the number and length of the douches with their temperature, can be carried, and a satisfactory conclusion can only be arrived at in the individual case by watching the effect of the treatment, and modifying it to suit that case. Another important question is, Is the treatment suitable in acute gout? and the answer is, Yes, if a suitable form of douche be

employed (that is, one not too energetic, and at a moderate temperature), and the treatment be commenced shortly after the acute attack has eliminated the gouty poison. Dr Vidal, as the result of his great personal experience at Aix, strongly insists upon these points, viz., the mild treatment immediately following the acute attack. Following this plan, I have found it answer admirably.

Here, I may say that I think that, in the case of the subject of acute sthenic attacks of gout, it would be better (save immediately after an attack) to take, prior to his course at Aix les Bains, a short course at Carlsbad. There is no doubt that it is more difficult to carry out a course of baths successfully (that is, without producing an acute gouty attack, necessitating an interruption of the treatment) in the strong full-blooded, than in the less robust individual.

In the second class of cases, the true rheumatic "arthritic," a much more energetic line of treatment can be carried out. Here is found the patient that did so well with the old Aix treatment, in the days before modification of the natural temperature and pressure was possible, and the only treatment used was in room at a temperature of about  $40^{\circ}$  C., and with water at temperature of  $43^{\circ}$  to  $45^{\circ}$ , the general douche being combined with general vapour bath, a treatment which often produced as unfortunate results in the gouty, as it did good to the rheumatic patient.

For the rheumatic patient, then, instead of the douche at a temperature of  $34^{\circ}$  or  $36^{\circ}$  C., one at  $38^{\circ}$ , or even  $40^{\circ}$ , can be employed, combined with, in many cases, the bouillon or general vapour bath, the latter preceding or succeeding the douche, according to the effect desired, the douche following the vapour bath modifying its action, diminishing its effect; the whole being followed by carefully wrapping the patient up in blankets—the so-called "emmaillotage"—and his transport home to his bed thus wrapped up, there to lie from fifteen to twenty minutes; the whole treatment (high temperature, douche, vapour bath, and emmaillotage) being ordered with the view of producing a very free action

of the skin, a result that rarely fails where the above treatment is properly carried out.

The general vapour bath can be given in these cases in connection with, and combined with the douche, or separately, by means of the "caisse," where the patient sits in a closed box, into which the vapour has free access, with his head and neck projecting through a hole in the cover. This severe treatment requires, of course, strict medical surveillance. It produces at first, as a rule, an increase or awakening of the rheumatic pains; but this, as I said, is a good sign, and the pains are not often severe enough to require a discontinuance of the treatment, though it may, at times, be necessary to modify the temperature, or lessen the duration of the douche, and give an occasional day of repose, if the patient find it too debilitating. But we do not get in the rheumatic patient the constitutional disturbance, and distress, which would arise in a gouty patient, if treated in the same manner.

In all cases it is well to commence the treatment mildly, and gradually to increase its severity as required by the individual case. This is especially true of a large number who come under treatment at Aix, where the diagnosis is doubtful, as evidenced by the opposite opinions, given by the various medical men whom the patient may have consulted, some considering the affection as a gouty one, and others as rheumatic. In such a doubtful case, considerable light is often thrown upon its true nature by the effect of the treatment, which sometimes entirely settles the question, by exciting characteristic local manifestations.

*Counter-indications* to Aix treatment are chiefly found in some forms of kidney and heart disease. Advanced kidney disease is a decided counter-indication. In all cases where there is albuminuria, the effect of the treatment upon the kidneys must be carefully watched, under pain of seeing acute mischief supervene, the irritated kidney being unable to excrete the increased amount of urea and uric acid thrown into the general circulation, and their consequent retention quickly showing itself by uræmic symptoms.

Degeneration of the muscular fibre of the heart is a formal counter-indication to any treatment.



Valvular affections, especially if of rheumatic origin, are by no means so. Heart affections left by a rheumatic attack, when they are not of too long standing, do improve at Aix; of that there is no doubt, the murmurs often diminishing in intensity, and the character (force and rhythm) of the cardiac act on improving considerably; but then, it is difficult to determine how much of this improvement is due to the disappearance of any valvular change that may have existed, and how much to the improvement of the patient's general health, the marked anemia so often present in this class of patient rapidly disappearing under the anti-rheumatic treatment, the vanished murmur having been probably largely hemic in nature. All the medical men attached to the Thermal Establishment who have written upon the subject—*viz.*, Drs Vidal, Berthier, Brachet, Blanc, Leonard, Wakefield, Marcé, and Cozalis—agree that in certain recent cases of murmurs, due to rheumatic endocarditis, marked improvement, if not absolute cure, can be obtained. Dr Blanc, in a recent carefully written paper upon the subject, supported by numerous cases and sphygmographic tracings, affirms positively the great use of the Aix treatment in rheumatic cardiac cases. He remarks, as a point for differential diagnosis between hemic and other murmurs, that the former tend to disappear at once, while murmurs due to endocarditic changes become more marked before disappearing.

Patients, however, with cardiac valvular disease, when the affection is advanced, and accompanied by a tendency to syncope and edema, have to be treated and watched very carefully, avoiding too high temperature of douche, or the use at all of vapour or even simple baths, the latter being often very badly borne. In these heart affections it is usual to have the patient carried to the douche room situated on the upper floor of the bath house, where the maximum pressure is four metres, and in all operations on the trunk and upper extremities use merely the water, reduced to the desired temperature, in the iron box or reservoir placed at a height of six feet. In many of these cases it is well to insist upon the patient being carried home to his bed, which has been well warmed, there to rest for an hour after the douche.



It may positively be stated that the more recent the case of heart disease, or murmurs, after an acute, or subacute, attack of rheumatic fever, the better the prognosis. The difficulty is after an attack of rheumatic fever to get the patient transported to Aix; but as soon as that were possible, I should not hesitate to undertake the treatment with a great hope of diminishing any cardiac mischief already commenced, and the certainty of lessening its degree, if not preventing its occurrence, in cases where it might be feared.

The experience of centuries has proved the efficacy of the Aix waters and treatment in the arthritic diatheses, and more modern careful investigation has proved its especial value in the rheumatic constitution, diminishing the severity of recurring attacks of rheumatism, in many cases entirely preventing their recurrence, —in all, diminishing the risk of unfortunate sequelæ.

Anæmia is not a counter-indication to the Aix treatment, but quite the reverse, especially when it followed upon some rheumatic affection; if it exist to a marked degree, it may at first necessitate a modification of the treatment that would otherwise be followed, —avoidance of general sudation, and a confinement for a first course to an ordinary tonic hydrotherapy; but frequently, even in these advanced cases, one is gradually able to pass on to the hot douche and general vapour bath, with nothing but good resulting.

The effect of the treatment in this form of anæmia can be compared with that of mercurials in the anæmia accompanying syphilis; in both cases the specific poison which causes the destruction of the blood corpuscles is removed or destroyed.

Space will not allow me to mention all the affections benefitted by, nor the minor indications and counter-indications for the Aix-les-Bains waters, but I must not omit to allude to the valuable means for local treatment of diseases of the larynx and pharynx, which exist both at Aix and Marlioz,—the latter, a place twenty minutes' walk from Aix, containing a strong cold sulphur spring, its fine spray application for the throat being used in combination with Aix general treatment.

Mention has been made, in a cursory manner, of the value of the Aix treatment in cutaneous affections, dependent upon the rheumatic or gouty constitution. It is in gouty eczema that the best results are obtained, and here the result of a three or four weeks' course is often remarkable; long-standing and scaly patches of eruption, that have resisted all other means of treatment, take on first a period of increased activity, alarming to the patient, but speedily followed by a rapid, and, in many cases, a complete cure. No treatment is attempted in acute eczema. In all cases the prognosis is dependent upon the patient's personal and family history.

The treatment of psoriasis is much less hopeful than that of eczema, even in the arthritic subject, and usually requires to be prolonged beyond the ordinary course. The younger the age of the patient the less hope is there of a complete cure, though some improvement may usually be promised.

In some cases of lichen planus that I have treated at Aix-les-Bains, which had previously undergone prolonged treatment at home, I, as well as the patients themselves, have been surprised at the rapid improvement produced after even a short course of baths.

In the syphilides the special bath treatment is always combined with mercurialunction, or some other specific remedies, so that it is unfair to refer the good results almost invariably obtained more to one than the other factor.

It will have occurred to the reader that the internal use of the water at Aix is entirely subordinate to their external application, but I would add that it is frequently the custom to combine with Aix external treatment the internal administration of the strongly iodised sulphur spring of Challes.

In conclusion, as the existence of a warm and equable temperature is of the greatest assistance in the "cure," it is well, as far as possible to ensure these conditions, not to send the patient to Aix before the beginning of the month of May.

